

June 18, 1891.

Sir WILLIAM THOMSON, D.C.L., LL.D., President, in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

Professor Daniel John Cunningham, Professor Percy Faraday Frankland, and Mr. William Napier Shaw were admitted into the Society.

The following Papers were read:—

- I. "Results of Hemisection of the Spinal Cord in Monkeys."  
By FREDERICK W. MOTT, M.D., B.S., M.R.C.P. Communicated by Professor SCHÄFER, F.R.S. Received June 1, 1891.

(Abstract.)

While engaged in studying experimentally the connexions of the cells of Clarke's column with the ascending tracts of the spinal cord in the monkey, I was surprised to find that after hemisection in the lower dorsal region the sensory disturbances produced in no way corresponded with those already obtained by eminent observers.

I was, therefore, led to continue my experiments, and, by the kind permission of Professor Schäfer, I carried them out in the Physiological Laboratory of University College. My thanks are also due to him for much valuable advice and assistance.

The subject is one of great importance from a scientific, as well as from a clinical, point of view. Some years ago, a case occurred in my practice which tended to shake my faith in the absolute truth of the doctrine of complete and immediate decussation of sensory impulses in the spinal cord, as taught by Brown-Séquard.

The experiments which I have performed exhibit the following principal points of interest:—

1. Return of associated movements after complete destruction of the crossed pyramidal tract below the lesion.
2. That all sensory impulses do not decussate in the cord, in fact, they appear to show that certain sensory impulses, *e.g.*, touch, the muscular sense and localisation in space, pass chiefly up the same side, painful impressions up both sides. A peculiar condition known as "allochiria" occurs after hemisection.

3. The vaso-motor disturbances are on the same side as the lesion, and consist of vaso-dilation, swelling of the foot, and redness with rise of temperature of the skin of the foot, but, as compared with the opposite side, fall of temperature in the popliteal space on the side of the lesion, due, no doubt, to paralysis of the muscles.

4. The degenerations above and below the lesion are limited to the same side when the injury is perfectly unilateral. There are certain facts connected with the degenerations which serve to show the origin and course of certain long and short tract fibres.

5. Stimulation of the cortex cerebri on both sides some weeks or months after the hemisection had been performed gave, as a rule, *results* which showed that the block in the spinal cord produced by the hemisection still existed, although there had been a very complete return of associated movements.

6. In one case ablation of the leg area on the same side as the lesion in the spinal cord was performed many months afterwards.

II. "The Origin and Progressive Motions of Cyclones in the Western India Region." By W. L. DALLAS. Communicated by R. H. SCOTT, F.R.S. Received June 2, 1891.

III. "Note on the Density of Alloys of Nickel and Iron." By J. HOPKINSON, F.R.S. Received June 3, 1891.

In the 'Proceedings of the Royal Society,' December 12, 1889, January 16, 1890, and May 1, 1890, I described certain properties of alloys of nickel and iron containing respectively 22 per cent. and 25 per cent. of nickel. These alloys can exist in two states at temperatures between 20° or 30° C. below freezing and a temperature of near 600° C. After cooling, the alloys are magnetisable, have a lower electric resistance, a higher breaking stress, and lesser elongation; after heating the alloys are not magnetisable, have a higher electric resistance, a lower breaking stress, and greater elongation. I have now to add another curious property. These alloys are about 2 per cent. less dense when in the magnetisable than when in the non-magnetisable state. Two rings were tested containing respectively 25 per cent. and 22 per cent. of nickel with the following results, the densities being given without correction in relation to the density of water at the then temperature:—